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Hayton et al.

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(54) **ELECTRONIC DOCUMENT READING DEVICES**

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See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,021,306 A 2/2000 McTaggart

6,124,851 A 9/2000 Jacobson

(Continued)

FOREIGN PATENT DOCUMENTS

GB 2446499 8/2006

JP 2001356323 12/2001

(Continued)

OTHER PUBLICATIONS

United Kingdom Search Report for corresponding Application No. GB0918619.6 dated Feb. 22, 2010.

(Continued)

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ABSTRACT

We describe an architecture for a large-area, touch-sensitive electronic document reading device which is able to tolerate bending. In broad terms, a control circuit board is mounted behind a flexible display structure in the housing and at respective points of attachment of first and second laminar connectors to the control circuit board each laminar connector has a plurality of electrical connections running along a longitudinal direction of the laminar connector and disposed alongside one another in a transverse direction across the laminar connector. At the respective points of attachment of the first and second laminar connectors to the control circuit board the longitudinal directions of the laminar connectors are aligned such that, when said device is flexed, a relative displacement in said longitudinal direction between said control circuit board and of said display structure can be tolerated without damage to the control electronics, touch sensitive display screen or connections therebetween.

6 Claims, 14 Drawing Sheets

